

2009

Now in its 41th Year

Lecturer:

Reginald H. Keith, P.E.

# Noise Control for Buildings, Manufacturing Plants, Equipment and Products

Hoover & Keith

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# Noise Control for Buildings, Manufacturing Plants, Equipment and Products

**A four-day intensive noise course containing the basics of acoustics and the fundamentals of noise control technology applicable to: Buildings** *Objective: to make buildings acoustically comfortable and their noises unobtrusive.* Course provides the know-how of "room acoustics" (essential to all types of spaces – factories to auditoriums) with easy-to-understand procedures; includes sound transmission loss tables for wall and floor structures (many new ones in this course); includes noise level data and sound and vibration control recommendations for most electrical and mechanical HVAC equipment in buildings; contains detailed step-by-step procedure for handling noise control of ducted ventilation systems for HVAC engineers.

**Manufacturing Plants** *Objective: to make plants and noisy work places acoustically more acceptable and employees safe from noise-induced hearing loss.* Course discusses and emphasizes noise reduction methods, techniques, and materials for industrial and manufacturing applications, illustrated with numerous case histories of successful treatments; course notes include representative noise level data from the construction, manufacturing, transportation, and power generating industries.

**Equipment and Product** *Objective: to help design quieter products – they are wanted!* The basic noise control approaches covered in the course are applicable to almost all forms of noisy equipment and products.

**Outdoors and the Community** *Objective: to solve community noise problems, either before they occur or after they have developed.* Lecture notes contain data and methods for evaluating outdoor sound propagation to neighbors, for estimating sound levels that would be acceptable to neighbors, and for estimating the degree of reaction to outdoor noise by typical community groups.

**Suggested Registrants** • Consulting Engineers and Architects • Building Planners and Developers • Building Owners and Managers • Acoustical Materials Suppliers • Occupational Insurers This five-day training course includes lectures on basic aspects of acoustics related to noise control, on noise control for industrial equipment and facilities, and on noise and vibration control for mechanical systems in buildings. The lectures are organized to be responsive to the needs of the following variety of attendees: • Mechanical Engineers • Plant Engineers • Plant Managers • Safety Engineers • Industrial Hygienists • Machine Design Engineers • Ventilation Engineers • Product Designers • Environmental Engineers • Industrial Engineers

**Lecture Notes** The lecture notes support and enlarge on the material presented in the lectures, and include other material which will serve as a valuable reference following the course. The lecture notes are printed and copyrighted and filled with tables and graphs of the practical data and applications that have made this course highly regarded since 1969. The lecture notes are available only to attendees of the course.

**Certificate, A.B.I.H. and C.E.U. Credits** A certificate is presented to each registrant who attends all sessions of the course. The American Board of Industrial Hygiene awards 4.0 CM points for course attendance and 26 Professional Development Hours (PDH's) are issued to those requesting them.

## **4-day course: Noise Control for Buildings, Manufacturing Plants, Equipment and Products**

### **Outline of Lectures**

<b>Introduction to Acoustics</b>	A. Terminology and Meaning: Decibels, frequency distribution of noise, sound pressure level, decibel addition, A-weighted sound levels, sound power and sound intensity. B. Noise Criteria: Desired noise levels for working and living spaces, balanced spectra, speech interference by noise; influence of noise exposure on loss or preservation of hearing; OSHA Noise regulations; continuous, intermittent, and mixed noise exposures; sample calculations; community reaction to outdoor noise.
<b>Room Acoustics</b>	A. Sound Distribution Indoors: Influence of room geometry and machine density; acoustic absorption in rooms and machine enclosures or partial enclosures; sound power level—meaning and uses; sample calculations. B. Sound Transmission Loss: Sound transmission through walls, floors, ceilings; transmission loss tables for principal building structures; influence of doors and windows; sample calculation of noise from mechanical room to adjoining space; design of barrier walls, machine enclosures and cabinets; use of Data Forms to simplify calculations.
<b>Sound Levels of Mechanical and Electrical Equipment</b>	A. Building Equipment: Sound pressure or sound power level data for refrigeration machines, boilers, fans, cooling towers, condensers, roof-top units, pumps, motors, diesel and gas reciprocating engines, gas turbine engines, steam turbines, gears, transformers, etc.; sample calculations of sound levels in mechanical equipment room; sample noise specification for equipment. Industrial Equipment: Sound level data for representative transportation, construction, manufacturing and power plant equipment.
<b>Basic Approaches of Noise Control</b>	A. Procedure: Measurements of noise source; establishment of noise reduction goal; design of noise control treatments, checklist of approaches; helpful strategies in noise control. B. Forms of Noise Control: Noise control treatments and techniques include: complete and partial enclosures, mufflers and duct lining; air noise control (leaks, jets and fans), impact noise control, radiation area, absorption in rooms and enclosures, barrier walls, vibration damping, vibration isolation, pipe and duct wrapping, personnel booths, maintenance. C. Case Histories of Factory and Plant Noise Problems: Examples of high noise levels inside working areas of industrial plants; applications of noise control treatments to equipment and work spaces; examples taken from steel, automotive, metal-working, plastics, chemical and textile plants, food processing and bottling, office equipment, wood and pulp processing industry, power generating stations, engine test facilities, etc. D. Noise Control Costs: Approximate unit costs of acoustical materials and noise control products; representative range of costs for plant noise programs. E. OSHA Compliance Programs: Outline of steps involved: personnel and responsibilities, compliance plan, instrumentation, documentation.
<b>Special Problems</b>	A. Noise Control for HVAC Systems: The ducted air distribution system and air handling unit rooms. B. Vibration Control of Mechanical and Electrical Equipment: Vibration criteria for audibility and feelability; vibration isolation suggestions for equipment as a function of type, size, speed, & locations. C. Roof-top Units: Causes and solutions of noise and vibration problems associated with roof-top units.
<b>Outdoor Sound Propagation</b>	Effect of distance, atmospheric, barriers, trees; outdoor noise levels to neighbors; ambient noise considerations.
<b>Noise Measurements</b>	Suggestions and practices for good noise measurements; listing and discussion of equipment needs for typical noise measurement requirements.

### **Photographing or Tape-Recording of the Course Material is Not Permitted.**

**Course History** "Noise Control for Buildings, Manufacturing Plants, Equipment and Products" has evolved from decades of direct consulting experience in industrial and engineering acoustics. The course was originally established by Laymon N. Miller of Bolt Beranek & Newman Inc. in 1969. The present course offered by Hoover & Keith Inc., an acoustical consulting firm founded in 1978, builds on the original course using updated material reflecting advances in noise and vibration control technology.

During its 38 year history, over 5,800 persons have attended the course or a custom tailored version presented to corporate clients.

**City,Dates,Hotels for  
2009 Noise Course**

The Noise Course will be given only once in 2009 at the Holiday Inn Riverwalk in San Antonio, Texas on the week of 1-4 December 2009. A block of sleeping rooms is held for our group at special rates (see below)

It is URGENT that you make your own hotel room reservation as soon as possible. If you phone, you must specify you attendance as "Noise Control Lecture" in order to receive the group rates. Registration for the course does not include hotel rooms and meals. You must register with Hoover & Keith to be enrolled in the class; registering for a room in the hotel under the group block does not enroll you in the class. You will need to make your own plans if you are not going to stay at the Holiday Inn Riverwalk. i.e. hotels, travel arrangements, and etc.. If you cannot make it to the Noise Course, you are responsible to cancel your hotel rooms. The maximum registration for the Noise Course 2009 is 25 attendees only.

Holiday Inn, Riverwalk  
217 North St. Mary's  
Street  
San Antonio, TX 78205  
Phone: (210) 224-2500  
www.holiday-  
inn.com/sat-riverwalk  
Rates:  
Single/Double- \$149

Holiday Inn, Riverwalk is situated in the heart of San Antonio's business, theatre, and nightlife district, this Downtown/Riverwalk destination hotel offers easy walking access to all of the San Antonio Downtown area attractions: the Alamo, El Mercado, the Rivercenter Mall, Henry B. Gonzales San Antonio Convention Center, Alamodome and the Majestic Theater. Please check the web site for maps and more details.

**Meeting Times**

Tuesday- Thursday ( 1<sup>st</sup>- 3<sup>rd</sup> ): 8:30 a.m. to 5 p.m.  
Friday (4<sup>th</sup>): 8:30 a.m. to 3 p.m.

The morning break will start at 8 a.m.. Food will not be provided with the course. There will be complementary sodas, hot tea, and coffee during the breaks. The maximum registration is 25 attendees only.

**Registration and  
Payment**

The course tuition is \$1,750.00 per student. There will be a \$100 fee for purchase orders. A student will be considered a "confirmed" student, where a spot will be held, upon receipt of payment. Payment terms are net 30 days. American Express, MasterCard and Visa credit cards are accepted for tuition payments. Please see web site for more details. A confirmation letter will be sent to you once you are confirmed.

Use this address for  
registration or  
questions regarding  
registration and make  
checks payable to:  
Hoover & Keith Inc.

Hoover & Keith Inc.  
11391 MeadowGlen Lane  
Suite D  
Houston, TX 77082

Phone: (281) 496-9876  
Fax: (281) 496-0016  
www. hoover-keith.com  
[Noise-course@hoover-keith.com](mailto:Noise-course@hoover-keith.com)

**Cancelation Policy**

In the event that a confirmed student cannot attend the course, they may designate another person in their place for December 1-4, 2009. No refunds will be made in the event that a confirmed student cannot attend the course or that they cannot designate another person in their place for December 1-4, 2009. Course Tuition cannot be transferred to any other Noise Course.

**What Others  
Have Said**

Earlier registrants of the Training Course in Noise Control have volunteered these written comments:

*"Right on target!"*

*"Enjoyed the course very much."*

*"This was one of the best organized and worthwhile seminars that I have ever attended. Your down-to-earth approach was particularly appreciated."*

*"Course contained good applicable material that was well presented. The lecture notes are a good idea. Can concentrate on what is being said, not on taking notes."*

*"I also appreciate your obvious thoughtful and personal dedication to this subject and hard work and documentation from your experiences."*

*"Your notebook of charts and data is the most important book on my shelf."*

*"Your course is already being put to good use in two of our plants."*

*"We have applied a noise muffler per your suggestion. Lowered noise level by 22 dB. Thanks."*

*"This course paid for itself within two weeks after I got back. I don't think I ever attended a course where I received as much excellent material in such a short time."*

*"I have used the data and ideas from your notes numerous times in the last month."*

*"My ASHRAE Chapter should have heard this."*

*"It exceeded my expectations, and I feel fortunate I didn't miss it. Lecture notes valuable as a basic reference."*

*"The instruction in the course was outstanding. We consider this course to be one of the finest that we have ever sponsored."*

*"I felt that the lecture course was one of the finest professional presentations I have ever been privileged to attend."*

*"The course content had good depth and the presentations were handled in a most professional manner."*

*"Taking that course has really paid off!"*

*"This is great! The information is just fantastic!"*

*"I learned an enormous amount and it was well worth the time, effort and expense."*

*"Sure did enjoy the course. Would like to send associates to future courses."*

*"My professional abilities have been greatly enhanced through your efforts."*

*"I use my white binder from the course almost everyday."*

## **Lecturer**

### **Reginald H. Keith**

Reginald Keith, a principal with Hoover & Keith Inc., has been engaged in noise and vibration control design for over 28 years. A great deal of his experience has been in the power, pipeline, petrochemical and HVAC industries. He is a graduate of the University of Texas with a Masters Degree in Engineering and is a registered professional engineer in Texas and Oregon with a specialty in acoustics.

### **In-house Training**

Courses can also be prepared and presented to your company, group, or association. If interested, write for details. In-house training courses have been given to the engineering or safety staffs of the following companies or associations from 1970 to date:

3M Company

ADC, Indonesia

ALCOA

The Boeing Company

Consolidated Edison of New York

Cryovac Division, W. R. Grace & Co. (two courses)

John Deere & Company

Dow Chemical

Ford Motor Company

International Cellulose Corporation (two courses)

Illbruck (two courses)

Institute of Noise Control Engineering

Kaiser Aluminum and Chemical

Kinetics Noise Control, Inc.

Liberty Mutual Insurance Co.

Los Alamos National Laboratories

Mare Island Naval Shipyard

NASA Lewis Research Center (two courses)

National Council of Acoustical Consultants

Naval Medical Command, Norfolk

Owens-Illinois

Procter and Gamble Co. (four courses)

Reynolds Metals Company

R.J. Reynolds Tobacco Co.

SMI - Structural Metals, Inc.

Sandia National Laboratories

Sheldons Engineering, Canada

Tennessee Eastman Company

W. R. Grace & Co. (three courses)

**2009  
Noise Course  
Registration Form**

Name:

Company Name:

Address:

City:

State:

Zip:

EXT:

Telephone Number:

Facsimile  
No:

Email address:

**Check**

Check No:

Date:

**Credit Card**

Account # / Card #:

Expiration Date:

CVVZ code:

Billing address:

**For H&K use only**

Approval Code:

Transaction date:

Invoice  
Code:

Total Sale Amount:

Please email to [Noise-Course@hoover-keith.com](mailto:Noise-Course@hoover-keith.com) or Fax 281-496-0016